

Claims

1. A system for performing operations management  
5 in an environment of a plurality of resources comprising:

a plurality of devices corresponding to the plurality of  
resources, each of said devices performing the steps of:

characterizing said corresponding resource;

and

10 determining at least one relation between said  
corresponding resource and others of said plurality of  
resources.

2. A system for performing operations management  
15 as in claim 1 wherein said each device performs the further  
steps of:

selecting at least one of said resources having  
said at least one relation; and

transforming said selected resources to form at  
20 least one new resource in the environment.

3. A system for performing operations management  
as in claim 2 wherein said characterizing said corresponding  
resource step comprises the step of representing  
25 characteristics with a plurality of properties and/or  
processes.

4. A system for performing operations management  
as in claim 3 wherein said selecting at least one of said  
30 resources step comprises the steps of:

identifying matching ones of said properties and/or  
processes to form a plurality of matching groups;

evaluating said matching groups by computing how well said attributes match; and

selecting at least one of said matching groups that are optimal with respect to said evaluation.

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5. A system for performing operations management as in claim 3 wherein said properties are selected from the group consisting of isa, hasa, doesa, and needsa.

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6. A system for performing operations management as in claim 2 wherein said devices perform the further step of:

determining a graph representation of said resources and said relations.

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7. A system for performing operations management as in claim 1 wherein said determining at least one relation step comprises the step of:

searching for complementary ones of said resources.

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8. A system for performing operations management as in claim 7 wherein said determining at least one relation step comprises the step of:

25 searching for resources having complementary ones of said properties and/or processes.

9. A system for performing operations management as in claim 1 wherein said determining at least one relation step comprises the step of:

30 searching for substitute ones of said resources.

10. A system for performing operations management as in claim 9 wherein said determining at least one relation step comprises the step of:

searching for resources having substitute ones of  
5 said properties and/or processes.

11. A system for performing operations management as in claim 1 wherein each of said plurality of devices is physically attached to said corresponding resource.

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12. A system for performing operations management as in claim 1 wherein each of said devices comprise data to identify said corresponding resource.

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13. A system for performing operations management as in claim 12 wherein said data is a bar code.

14. A system for performing operations management in an environment of a plurality of resources comprising:

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a plurality of devices corresponding to the resources, each of said devices performing the step of:

characterizing said corresponding resources;  
and

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selectively transforming said corresponding resource.

15. A system for performing operations management as in claim 14 wherein said selectively transforming said corresponding resource comprises the steps of:

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determining a plurality of candidate transformations of said corresponding resource; and

evaluating at least one expected consequence of performing said at least one candidate transformation on a subset, *P*, of the plurality of resources.

5           16. A system for performing operations management as in claim 15 wherein said selectively transforming step further comprises the step of:

performing said selected candidate transformation.

10           17. A system for performing operations management as in claim 15 wherein said subset, *P*, of the plurality of resources is a proper subset.

15           18. A system for performing operations management as in claim 14 wherein said selectively transforming step is performed by only a portion, *tau*, of said devices.

18           19. A system for performing operations management as in claim 14 wherein said selectively transforming said  
20           corresponding resource step comprises the step of:  
determining a plurality of candidate  
transformations of said corresponding resource;  
assigning said corresponding resource to at least  
one patch of said resources;  
25           evaluating a utility of said patch of resources of performing said candidate transformations; and  
selecting at least one of said candidate  
transformations that is optimal with respect to said utility.

30           20. A system for performing operations management as in claim 19 wherein said patch is a proper subset of the plurality of resources.

21. A system for performing operations management as in claim 19 wherein said at least one patch is at least one disjoint subset of the plurality of resources.

5           22. A system for performing operations management in an environment of entities and resources comprising:

          a plurality of devices corresponding to the plurality of resources, each of said devices performing the steps of:

10               representing said corresponding resource with data; and

          transmitting said characterizing of said corresponding resource to others of said plurality of devices; and

15               at least one computer, said computer performing the steps of:

          receiving said data for said at least one devices; and

20               determining at least one relation among the resources for said data.

23. A system for performing operations management as in claim 22 further comprising a communication network communicating said data among said at least one computer and said at least one integrated circuit.

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24. A method for performing operations management in an environment of a plurality of resources comprising the steps of:

30               defining at least one algorithm having one or more parameters for performing operations management;

defining at least one global performance measure of  
said at least one algorithm;

executing said algorithm for a plurality of  
different values of said one or more parameters to generate a  
5 corresponding plurality of values for said global performance  
measure;

constructing a fitness landscape from said values  
of said parameters and said corresponding values of said  
global performance measure; and

10 optimizing over said fitness landscape to generate  
optimal values for said at least one parameter.

25. A method for performing operations management  
as in claim 24 wherein said defining an algorithm step  
15 comprises the steps of:

representing the plurality of resources with a  
corresponding plurality of devices wherein each of said  
devices performs the steps of:

characterizing said corresponding resource;  
20 and  
selectively transforming said corresponding  
resource.

26. A method for performing operations management  
as in claim 25 wherein said at least one parameter comprises  
25 a proportion,  $p$  of the plurality of resources.

27. A method for performing operations management  
as in claim 26 wherein said selectively transforming said  
corresponding resource step comprises the steps of:  
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determining a plurality of candidate transformation of said corresponding resource; and  
evaluating at least one expected consequence of performing said at least one candidate transformation on  
5 said proportion,  $p$  of the plurality of resources.

28. A method for performing operations management as in claim 27 wherein said selectively transforming step further comprises the step of:

10 performing said selected candidate transformation.

29. A method for performing operations management as in claim 25 wherein said at least one parameter comprises  
15 a fraction,  $\tau$ , of said plurality of devices.

30. A method for performing operations management as in claim 29 wherein said selectively transforming step is performed on only said fraction,  $\tau$ , of said plurality of  
20 devices.

31. A method for performing operations management as in claim 25 wherein said at least one parameter comprises a size of one or more patches of said plurality of devices and a location of said patches.  
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32. A method for performing operations management as in claim 31 wherein said selectively transforming said corresponding resource step comprises the step of:

30 determining a plurality of candidate transformations of said corresponding resource;

assigning said corresponding resource to at least one of said patches of said resources;

evaluating a utility of said patch of resources of performing said candidate transformations; and

5            selecting at least one of said candidate transformations that is optimal with respect to said utility.

33. A device for performing operations management in an environment of a plurality of resources, said device  
10 representing one of the resources and comprising at least one memory storing computer executable program codes, wherein the program code comprises:

code to characterize said corresponding resource;  
and

15            code to determine at least one relation between said corresponding resource and others of said plurality of resources.

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